

BOARD OF SECONDARY EDUCATION, KARACHI

Secondary School Certificate (S.S.C.) Annual Examination

Class X (Science Group)	Mathematics	2024	English Medium
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Max. Marks: 75 | Time: 3 Hours

SECTION "A" — MULTIPLE CHOICE QUESTIONS (MCQs) Marks: 15

NOTE: (i) Attempt all the Questions of this Section. (ii) Do not copy down the part questions. Write only the answer against the proper number of the Question and its part according to the question Paper. (iii) Each question carries 1 Marks

1. Choose the correct Answer for each from the given question:

(i)	It is not a commutative operation ☆ Difference ☆ Union ☆ Intersection ☆ Symmetric difference
(ii)	If $O(A \times B) = 100$ and $O(B) = 5$ then $O(A) =$: ☆ 10 ☆ 15 ☆ 20 ☆ 25
(iii)	If the determinate of a matrix is zero, is called: ☆ Singular matrix ☆ Non-Singular matrix ☆ Unit matrix ☆ Diagonal matrix
(iv)	The symbol of similarity of triangles is: ☆ = ☆ $\cong$ ☆ $\sim$ ☆ $\leftrightarrow$
(v)	If 1, 9, x and 45 are in proportion, then x =: ☆ 27 ☆ $\frac{1}{5}$ ☆ 5 ☆ 45
(vi)	If $a : b = c : d$ then according to alternando property: ☆ $\frac{a}{b} = \frac{c}{d}$ ☆ $\frac{a+b}{b} = \frac{c+d}{c}$ ☆ $\frac{b}{a} = \frac{d}{c}$ ☆ $\frac{a}{c} = \frac{b}{d}$
(vii)	If p and q are the roots of $2x^2 + 5x + 3 = 0$ then $p + q =$: ☆ $\frac{5}{3}$ ☆ $\frac{3}{5}$ ☆ $\frac{5}{2}$ ☆ $-\frac{5}{2}$
(viii)	The inscribed angle of minor arc of a circle is: ☆ acute angle ☆ right angle ☆ obtuse angle ☆ reflex angle
(ix)	An improper fraction can be reduced into proper fraction by: ☆ addition ☆ multiplication ☆ subtraction ☆ division
(x)	$\omega^2 + \omega =$: ☆ 0 ☆ 1 ☆ -1 ☆ none of these
(xi)	The standard deviation is the positive square root of: ☆ Median ☆ Mode ☆ Variance ☆ None of these
(xii)	In a right angled triangle, the greatest angle is: ☆ 45° ☆ 90° ☆ 80° ☆ 110°
(xiii)	$\operatorname{cosec}^2\theta - 1 =$: ☆ $\sin^2\theta$ ☆ $\sec^2\theta$ ☆ $\sin^2\theta$ ☆ $\cot^2\theta$
(xiv)	Angle between the radial segment and tangent at its outer end point is: ☆ 45° ☆ 60° ☆ 90° ☆ 120°
(xv)	In a right angled triangle, the opposite side of 90° is called: ☆ Base ☆ Perpendicular ☆ Hypotenuse ☆ none of these

SECTION "B" (Short Answer Question) Marks: 30

NOTE: Answer any SIX (06) questions from this section. All questions carry equal marks.

2.	If $A = \{1, 2, 3, 4, 5, 6\}$, $B = \{2, 4, 6, 8, 10\}$ and $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$ Prove that $(A \cap B)' = A' \cup B'$													
3.	Solve the equation by using componendo-dividendo theorem: $\frac{(x + 3)^2 + (x - 1)^2}{(x + 3)^2 - (x - 1)^2} = \frac{5}{4}$													
4.	Find the remaining trigonometric function if $\sin\theta = \frac{\sqrt{3}}{2}$ and θ lies in second quadrant.													
5.	Find all the cube roots of -125													
6.	Resolve into partial fractions: $\frac{4x - 3}{(x + 1)^2}$													
7.	The following data show number of devices resulting in observation values in appropriate ranges. Find the Harmonic Mean (H.M.) <table><tr><td>Class limit</td><td>10.5 - 10.9</td><td>11.0 - 11.4</td><td>11.5 - 11.9</td><td>12.0 - 12.4</td><td>12.5 - 12.9</td></tr><tr><td>Frequencies</td><td>2</td><td>7</td><td>10</td><td>12</td><td>8</td></tr></table>	Class limit	10.5 - 10.9	11.0 - 11.4	11.5 - 11.9	12.0 - 12.4	12.5 - 12.9	Frequencies	2	7	10	12	8	
Class limit	10.5 - 10.9	11.0 - 11.4	11.5 - 11.9	12.0 - 12.4	12.5 - 12.9									
Frequencies	2	7	10	12	8									
8.	Prove that $\sin^2\theta = \frac{\tan^2\theta}{1 + \tan^2\theta}$													

9.	A straight line, drawn from the centre of a circle to bisect a chord (which is not a diameter) is perpendicular to the chord. Prove it	
10.	If two chords of a circle (or of congruent circles) are equal, then their corresponding arcs (minor, major, semi-circle) are congruent. Prove it.	
11.	Any two angles in the same segments of a circle are equal. Prove it OR Find the mean deviation of the marks of students which are 4, 7, 12, 76, 48, 4, 51.	

SECTION 'C' (Detailed - Answer Question) (30)

NOTE: Attempt any **THREE(03)** questions from this Section. All questions carry equal marks.

12.	Find the invers of the matrix $A = \begin{vmatrix} 2 & 1 & 1 \\ 3 & 2 & 1 \\ 2 & 1 & 2 \end{vmatrix}$ by adjoint method	
13.	A line parallel to one side of a triangle and intersecting the other two sides, divides them proportionally. Prove it.	
14.	If a square of one side of triangle is equal to the sum of the squares of the other two sides, then the triangles a right angled triangle. Prove that.	
15.	Draw the circumcircle of ΔABC in which $m\overline{AB} = 5.5cm$, $m\overline{AC} = 6cm$ and $m\angle A = 60^\circ$ (Also write steps of construction)	
16.	If two circles touch externally, the distance between their centres is equal to the sum of their radii. Prove it. OR If a line is drawn perpendicular to a radial segment of a circle at its outer end point, it is tangent to the circle at that point. Prove it.	

Notes on this reproduction

- Typeset by Tayarri from the printed question paper; no answer key is reproduced. The source sheet is pre-ticked by the publisher, so options are given unmarked.
- Source sheet is a guide reprint: no board monogram and no paper code are printed.
- Neither section prints per-question marks; the marks column is left empty. Section B is six of eleven for 30, Section C three of five for 30, plus 15 for the MCQs — the 75 total the sheet prints.
- Two printing slips on this sheet.** MCQ (xiii) lists $\sin^2\theta$ twice, as both its first and third option. Section B question 2 opens "If = {1, 2, 3, 4, 5, 6}" with the set name A missing, though the proof it asks for names A; the Urdu-medium sheet prints A there. Both reproduced as printed.
- Board spellings kept verbatim: "determinate" (determinant), "None of thses", "numberof" run together, and "invers" in Section C question 12.